ABSTRACT

The invention is a nanoporous silicon bioreactor for the maintenance of cells in culture in a differentiated state. Each cell or group of cells is grown in an individual macropore and is provided with nutrients by perfusion of the nanoporous silicon support with fluid. Bioreactors may be used to used to test compounds for biological activity, metabolism, toxicity, mutagenicity, carcinogenicity or to characterize novel or unknown comounds. Additionally, the bioreactors are sufficiently robust that they may be assembled into larger reactors to simulate organ function or be used for the production of biomolecules.